MULTIMEDIA UNIVERSITY

STUDENT ID NO

MULTIMEDIA UNIVERSITY

FINAL EXAMINATION

TRIMESTER 3, 2015/2016

BMG3014 – MANAGEMENT OF TECHNOLOGY

(All Sections)

30 MAY 2016
9.00 a.m. – 11.00 a.m.
(2 Hours)

INSTRUCTIONS TO STUDENTS

1. This question paper consists of **THIRTEEN (13)** printed pages with **TWO (2)** sections.
2. Answer **ALL** sections.
3. Marks are shown at the end of each question.

SECTION A: MULTIPLE CHOICE QUESTIONS (50 MARKS)

1. The goal of management of technology and innovation in an organization should always be to:
   A. Create new technology that is groundbreaking
   B. Expand the number of employees in R&D
   C. Create value for the firm
   D. Be efficient

2. _____ showed that the residual growth in GDP is due to technological change; where technological innovation increased the amount of output achievable from a given quantity of labour and capital.
   A. Technological Change Residual
   B. Merton Residual
   C. Solow Residual
   D. Innovation GDP Index

3. Which of the following are the key components of management of technology?
   A. Managing Technology; HRM; Marketing; Budgeting
   B. Technology; Innovation; R&D; Transfering; Forecasting; Strategic Management
   C. Managing Innovation; Technology Forecasting; Technology Transfer
   D. Product Development; Product Launch; Promotion; Pricing; Place

4. Experts agree that management of technology involves which area(s) of the organization?
   A. R&D only
   B. Strategic Management, R&D and Marketing
   C. Engineering, Production and Operations, and Finance
   D. All areas

5. Professor Ken Green (1998) defined technology as being the combination of _____.
   A. R&D, Engineering and Marketing
   B. Product, Process and Systems
   C. Scientific Discoveries, Product Development and Product Utilization
   D. Knowledge, Skills and Artefacts

6. Experts agree that the following are among the main reasons why addressing the issue of technological change in the workplace is critical, except;
   A. Businesses use technology as part of major success strategies.
   B. Technology-driven change is everywhere and always present.
   C. Workers are normally receptive to new technologies
   D. Value-capture from new technology is challenging and never guaranteed.

Continued...

7. _____ models how organisations can capture value from purchased technology when it is essentially available to anyone, including competitors.
   A. Value Capture Model
   B. Merton Solow Model
   C. Appropriation of Rents
   D. Appropriation of Technology

8. Which of the following is NOT true?
   A. Technologies are not confined to a specific application, business or industry.
   B. While development generally occurs within narrow specialty areas, the advantages produced can only be gained by linking technologies together into larger systems.
   C. Accounting, marketing, and financial techniques are not technologies.
   D. Technologies include individual know-how, craftmanship or artistic skills, and knowledge that do not lead directly to industrial applications.

9. Realising that most firms and competitors within their industry have required the same level of competence in other areas of management, such as operations, human resources, marketing, strategy, and the like, many firms have begun to look to _____ as a key differentiating factor for competitive advantage.
   A. technology
   B. innovation
   C. R&D
   D. creativity

10. The technology audit concept is;
   A. where we decompose products and processes into discrete technologies
   B. technologies to be seen as combinations of knowledge, skill and relevant hardware
   C. level of disaggregation is until small groups of (non-substitutable) individuals
   D. All of the above

11. According to Schumpeter's _____ model, more R&D in equals to more innovation out.
   A. Technology-Push
   B. Demand-Pull
   C. Coupling
   D. Integrated

Continued...

12. Individual creativity is a function of:
    A. Intellectual abilities, knowledge, style of thinking
    B. Style of thinking, personality, motivation
    C. Personality, motivation, environment
    D. All of the above

13. _____ is one of the factor that had been recognized as one of the key answer as to why some organisations can be more innovative than others.
    A. Risk taking and age
    B. Adult playfulness
    C. Resistance to change
    D. Mobility

14. When deciding to make changes in your manpower, some data even show that the more radical the new technology, the more important it is for the new person to occupy a _____ position to stimulate adoption.
    A. senior
    B. R&D
    C. intermediate
    D. marketing

15. Phases in managing innovation:
    A. Concept definition, Product planning, Product Engineering, Process Engineering, Product Launch
    B. Research, Development
    C. Scanning, Strategy, Resourcing, Implementation, Learning and Re-innovation
    D. Vision, Mission, Goals, Strategy, Action

16. To ensure that the plan for an innovation strategy can be implemented, the manager should answer which key initial question(s)?
    i. What should we be doing now, and what can we do later?
    ii. What are the time and/or specialized skills required for the prioritized activities?
    iii. What should be delegated and to whom?
    iv. Are there any fatal flaws in the product or service's basic design or concept?
    A. i and ii
    B. i, ii and iii
    C. iii and iv
    D. All of the above

Continued...

17. _____ is broad scanning of potential sources of knowledge, many of which are far removed from the firm's immediate businesses.
    A. Innovation Monitor
    B. Technological Scanning
    C. Broadband Scope
    D. Schmookler Model

18. Different sources of information are more useful at different stages of the acquiring company's technology cycle; university-industry workshops, patent searches, and engineering conferences are useful for which stage?
    A. Technology development stage
    B. Product development stage
    C. Process development stage
    D. Procurement stage

19. _____ is a way of developing internal technological capabilities based on specific organisational mechanisms. This process consists of setting up separate units within the existing corporate entity.
    A. Internal development
    B. Intrapreneurship
    C. Alliance
    D. Private label

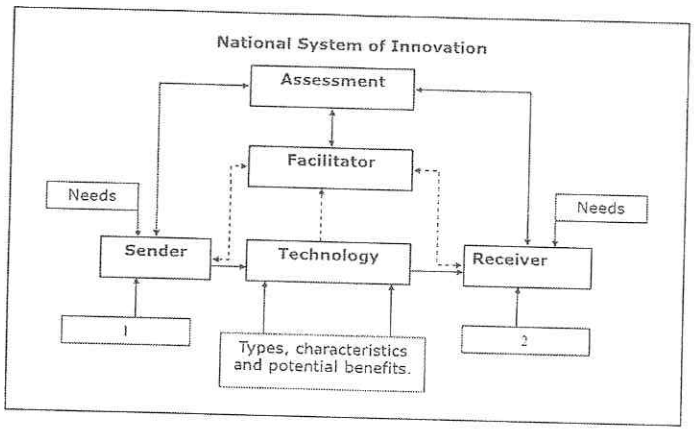
20. _____ is to buy finished goods or components to be assembled and sell them under the firm's own trade mark.
    A. Internal development
    B. Intrapreneurship
    C. Alliance
    D. Private label

21. A firm may opt against collaboration and engage in a development project on their own due to;
    A. They possess all the needed capabilities and resources for the particular project
    B. Want to have some control over the project's development and returns
    C. Want to destroy obsolete capabilities
    D. None of the above

22. Dosi (1982) defined technology transfer into;
    A. Material transfer, Design transfer and Capacity transfer
    B. Hardware transfer, information transfer and knowledge transfer
    C. Market transfer, Production transfer and R&D transfer
    D. Activity transfer and Information transfer

Continued...

23. Complete the following diagram;



1 and 2 are:
A. Material and Capacity
B. Willingness and Readiness
C. Production and R&D
D. Activity and Information

24. When is external exploitation appropriate?
A. The firm wants to enter markets which it cannot directly penetrate because of trade barriers, local content, etc.
B. The firm possesses the resources or "complementary assets" to enter the market directly.
C. The firm wants to purchase technologies with other firms.
D. The firm's technology is protected via trade secrets.

25. _____ refers to an expanding set of endpoints people use to access applications and information or interact with people, social communities, governments and businesses. It includes mobile devices, wearable, consumer and home electronic devices, automotive devices and environmental devices — such as sensors in the Internet of Things (IoT).
A. Web-scale IT
B. Smart Machines
C. Device Mesh
D. Digital Mesh

26. _____ is the combination of data streams and services created by digitizing everything creates four basic usage models — Manage, Monetize, Operate and Extend.
A. Web-scale IT
B. Internet of Things (IoT)
C. New IT Reality
D. Digital Mesh

Continued...

27. According to Gartner's Hype Cycle _____ is when more instances of how the technology can benefit the enterprise start to crystallize and become more widely understood. Second- and third-generation products appear from technology providers. More enterprises fund pilots while conservative companies remain cautious.
A. Trough of Disillusionment
B. Peak of Inflated Expectations
C. Slope of Enlightenment
D. Plateau of Productivity

28. According to Gartner's Hype Cycle _____ is when interest wanes as experiments and implementations fail to deliver. Producers of the technology shake out or fail. Investments continue only if the surviving providers improve their products to the satisfaction of early adopters.
A. Trough of Disillusionment
B. Peak of Inflated Expectations
C. Slope of Enlightenment
D. Plateau of Productivity

29. The _____ type of tools for technology forecasting involves identifying social, political, economic and other environmental factors that might affect your company.
A. Surveillance
B. Projective
C. Normative
D. Integrative

30. The _____ type of tools for technology forecasting includes trend extrapolation, substitution analysis, and examination of historical precursors of a current trend.
A. Surveillance
B. Projective
C. Normative
D. Integrative

31. The _____ ensures anonymity for the participants and people are less inhibited with their ideas or opinions in the situation. There are no competition, status pressures and conformity issues that usually get in the way in meetings. Higher degree of individual participation. Individual opinions get more attention and each participant has greater opportunity to assure that their ideas are part of the group's frame of reference. The opinions are from experts, whom have in depth knowledge. Ensures the participants remain focused on the problem.
A. Expert opinion
B. Nominal Group Technique
C. Delphi Method
D. Scenarios Writing

Continued...

32. Your team is currently in the last day of your strategic retreat and concluding the 4th step of the Nominal Group Technique exercise. Ish, May, Siva and Ray had identified System X, System Y and System Z respectively as their top 3 picks. Jo and Jasmine proposed System P, System X and System Q. Siti, Bill, Bob, Suzanne and Juriah all agreed on System Y, System T and System X. Bikesh, Athil and you proposed System N, System X and System Y. What is the likely conclusion of your NGT exercise i.e.: the top five (5) priority list?
    A. X, P, Q, T, N
    B. X, Y, T, Z, N
    C. P, N, X, T, Z
    D. Y, X, T, Z, N

33. Planning for the introduction of a new technology includes consideration of both internally and externally oriented management issues. Externally oriented issues include the following, except;
    A. Interface with the market, including the integration aspects.
    B. Customer-supplier and producer-user relationships.
    C. Support for innovative activities from internal sources, such as government and stakeholders.
    D. Accountability to shareholders in terms of new technology investment and benchmarking of performance.

34. Bartlett and Ghoshal encourage the _____; resources and skills anywhere in firm can be leveraged to exploit opportunities in any geographic market.
    A. globally linked
    B. locally leveraged
    C. transnational approach
    D. centre for global model

35. _____ is a test phase that aims to establish whether a project is conceptually and financially sound and that sufficient demand for the product or service exists, prior to becoming a full scale operation. It helps to demonstrate the technical feasibility of the technology to top management and serve as a credible demonstration model for other units in the organisation.
    A. Prototype
    B. Beta version
    C. Pilot
    D. Experiment

36. _____ is a function of technological complexity, the capabilities of the firm, and the ability of the firm to learn from its activities.
    A. Innovation
    B. Competitive advantage
    C. Core competency
    D. Managing innovation

Continued...

37. Using _____ to analyze business issues is merely one form of decision making, similar to profit maximization, legal compliance, or religious beliefs. The difference, however, between _____ and these other bases for decisions is that _____ can serve as the foundation for each of the other methods.
    A. innovation
    B. corporate social responsibility
    C. sustainability
    D. ethics

38. Low cost cataract surgery, Chotukool and Tata Nano are all examples of
    A. Sustainable Innovation
    B. Corporate Social Responsibility
    C. Inclusive Innovation
    D. Ethical Innovation

39. _____ translate to the production of cleaner products, more efficient processes, alternative technologies, new services and system innovations.
    A. Sustainable Innovation
    B. Corporate Social Responsibility
    C. Inclusive Innovation
    D. Fairtrade

40. _____ is about better prices, decent working conditions, local sustainability, and fair terms for farmers and workers in the developing world.
    A. Sustainable Innovation
    B. Corporate Social Responsibility
    C. Inclusive Innovation
    D. Fairtrade

41. _____ is changes in technology that while not constant reflect a progression of changes that happen over a relatively short period of time.
    A. Sustainable Innovation
    B. Continuous Technology
    C. Radical Innovation
    D. Next Generation Technology

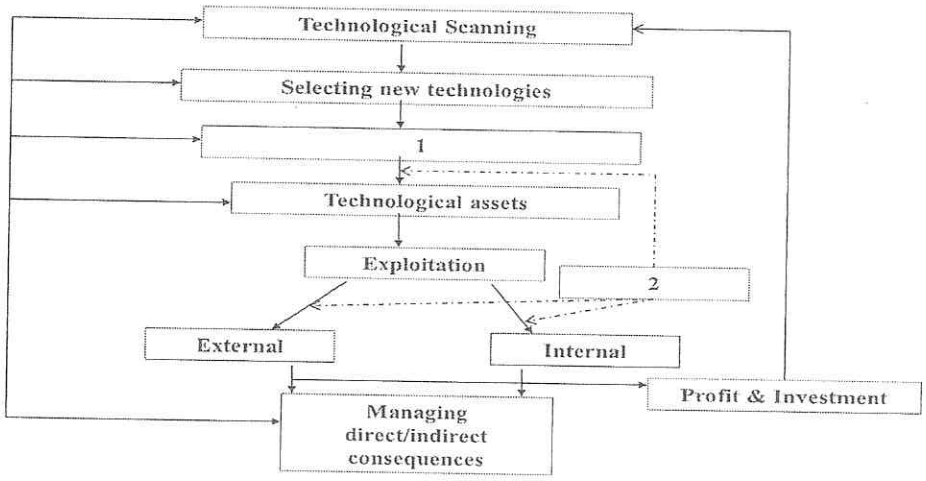
42. _____ occur when the benefits from the research activities of one entity spread to other entities. This is a major feature of technology clusters such as the Silicon Valley.
    A. Innovation Web
    B. Continuous Technology
    C. Technology Spillover
    D. Agglomeration Economies

Continued...

43. Innovation adopters categories can be represented graphically by
    A. S Curve
    B. Bell Curve
    C. Bathtub Curve
    D. Linear Graph

44. The trend towards increased in strategic partnerships is due to the emergence of several factors, except;
    A. The science content within technologies has increased and organisations do not have in-house expertise covering the whole scientific spectrum
    B. The costs of R&D have increased significantly and it tends to be too costly for a firm to bear on its own
    C. The competitiveness among firms is more intense, thus the pressure has increased on R&D to innovate more quickly
    D. Technology advancements such as big date and analytics allow firms to innovate to continue being competitive

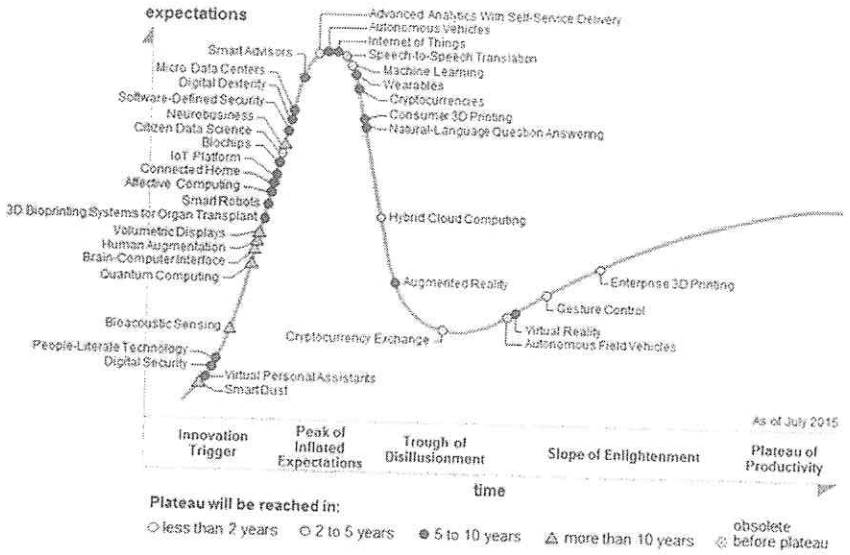
45. Complete the following diagram;



1 and 2 are:
A. Technology Forecasting and Technology Transfer
B. Technology Development and Innovation
C. Technology Acquisition and Technology Transfer
D. Technology Development and Dominant Design

Continued...

46. Referring to the figure given,



your CEO has decided to invest in enterprise 3D Printing technology, he can be classified as

A. Innovator
B. Laggard
C. Early Adopter
D. Late Majority

47. Innovation adopters categories can be represented graphically by

A. S Curve
B. Bell Curve
C. Bathtub Curve
D. Linear Graph

48. Your strategic alliance project had 19 stakeholders initially. Recently you have added 3 team members to the project. How many more communication channels do you have now compared with before?

A. 171
B. 231
C. 60
D. 1

Continued...

49. Many people choose to use Windows in order to maximize the number of people their files are compatible with, and the range of software applications they can use. This illustrates which effect?
    A. Dominant Design
    B. Incumbent Technology
    C. S Curve
    D. Network Externalities

50. The core characteristics of CSR include the following, except;
    A. Voluntary
    B. Social and economic alignment
    C. Profit maximisation
    D. Philanthropy

SECTION B: STRUCTURED QUESTIONS (50 Marks)

There are TWO (2) questions in this section. Candidates MUST answer ALL questions.

Question 1

a) You are a manager of a technology company. You know that the management need to ensure that the firm plans the products development so that there is a timely pipeline of products, i.e.: at any given time there are products at the earlier stages of their lifecycle positioned to grow and replace the current top products that will eventually move to the later stages of the lifecycle and decline. Technology Life Cycle model and Technology Diffusion model both can be used as tools to help support your argument. Please explain these models that enable you to have this understanding.

(10 Marks)

b) Most firms face serious constraints in capital and other resources and have to choose among numerous valuable potential projects. Your capital rationing method of choice is the Discounted Payback Period.

Project A:

- Initial investment cost – $2000.00
- Cumulative discounted cash inflows:
    - Year 1 $934.40
    - Year 2 $1833.40
    - Year 3 $2673.02
    - Year 4 $3465.11

Given the information above, determine the payback period for project A.

(5 Marks)

Continued...

c) How can managers ensure their technology forecasting activities are effective?

(10 Marks)

Question 2

a) Discuss the advantages and disadvantages of being the technology first mover.

(10 Marks)

b) The management of innovation does not need a radical shift in a product; instead, it can be as simple as a fresh insight on how a product can be used. X-Rite traditionally produced equipment to match colours in industrial settings. Thus, an auto manufacturer would test to ensure that their sky blue was consistent on all cars. The innovation that occurred for the firm was that matching paint has similarities to matching the colour of an individual's teeth in a dentist's office. Prior to this insight by X-Rite, the typical method of matching the colour of teeth was for dentist to hold a card with different variations of white and seek to judge which one matched the colour of the patient's teeth. The nature of the X-Rite equipment had to be changed to a form that was more accessible and user friendly than the industrial version. Issues such as hygiene related to the product also became part of design for the first time. However, the technology was the same as before. This innovation insight allowed X-Rite to move into a profitable new market and become a major competitor in this area. X-Rite has become the leader in colour matching in digital photography, dentistry, as well as paint colour in industrial applications.

Source: White and Bruton(2012) "Strategic Management of Technology and Innovation" 2nd Edition, CENGAGE Learning, UK. pp. 23.

What other uses can you think of for X-Rite's technology? (5 Marks)

Continued...

c) You are a technology and innovation consultant. You have just read through the Gartner Top Technology Trends Report for 2016. Based on further research after going through the report, your R&D team has developed 4 new R&D project proposals for your consideration. You then used the screening questions to come up with your project selection criteria. You then evaluated the proposals using the scoring model.

Project\Criteria & Weight	New Products 10	Customer Relations 8	Supplier Relations 5	Success Probability 5	Weighted Total Score
Project A	5	3	4	5	
Project B	4	3	5	5	
Project C	1	5	3	3	
Project D	2	4	1	2	

Complete the scoring model and give your final recommendations.

(10 Marks)

End of Page